Assignment #2: Problem formulation with multiple decision variables

Karim Kanji, IA-20

Maskininlärning och optimering

21.11.2023

Variables:

A = Anna	*B* = Barbara	*C* = Carol	*D* = Dany	*E* = Emily	*F* = Francesa	*G* = Gina	*H* = Helen	*I* = Inga

Function:

The objective is for Jenny to select up to 3 bridesmaids, with a preference for including Dany and Emily due to their wealth and therefore potential high-value gifts. This problem can be framed as maximizing the preference score, with a higher score for Dany and Emily

$$Maximize\ Z = 2D + 2E + A + B + C + F + G + H + I$$

Constraints:

1. Cooking: At least on of the good cooks must be selected:

   Constraint: A. $A + C + E \geq 1$

2. Conflict: Dany and Francesa have had a fight so they cannot work together:

   Constraint: A. $D + F \leq 1$

3. Speaking: Two great speakers must be selected:

   Constraint: A. $C + D + H + I \geq 2$

4. Sister: Helen and Barbara must be either both selected or neither selected:

   Constraint: A. $B = H$

5. French Speaking: At least one French speaker must be selected:

   Constraint: A. $E + I \geq 1$

6. Maximum Bridesmaids: No more then 3 bridesmaids can be selected:

   Constraint: A. $A + B + C + D + E + F + G + H + I \leq 3$

7. Integer: Each variable can only be 0 or 1, since we are handling people:

   Constraint: A. $A, B, C, D, E, F, G, H, I \in \{0,1\}$